Vol. 53 OCTOBER 1962 No. 5

Journal of Educational Psychology

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PUBLISHED BIMONTHLY BY:

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JOURNAL OF
EDUCATIONAL PSYCHOLOGY

Vol. 53 October 1962 Number 5

THE USE OF THE PARENT ATTITUDE RESEARCH INVENTORY WITH THE PARENTS OF BRIGHT ACADEMIC UNDERACHIEVERS[1]

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Responses to the Parent Attitude Research Inventory of parents of bright 10th- and 11th-grade academic achievers were compared to the responses of parents of bright academic underachievers. The responses of mothers and fathers (a total of 151 participants) were considered separately and in accordance with the sex of the child. Parents of underachievers had significantly stronger negative attitudes toward their underachieving child. Particularly pronounced was a trend toward Suppression of Sexuality among parents of underachievers.

In an earlier study of academic underachievement, Shaw and McCuen (1960) demonstrated that children classified as academic underachievers on the basis of their grades in high school typically had a long history of such behavior. In males trends toward this kind of behavior were seen as early as the first grade and were generally a characteristic of the group by the third grade. Such early appearance was not a characteristic of the female groups, the trend toward underachievement not beginning until Grade 6.

The findings of this study suggested the possibility that conditions antecedent to school entrance might have at least a partial bearing on the development of underachieving behavior, and more specifically, that parent attitudes might be associated with failure to perform effectively in school. The present study represents an attempt to determine whether or not differences exist between the parents of achievers and the parents of underachievers with respect to their attitudes toward children and an attempt to determine, in a limited way, what the nature of these differences may be.

[1] This research is part of a project which was supported by a grant from the National Institute of Mental Health.

Procedure

Tenth and eleventh grade students in a high school of 1,800 students constituted the pool from which subjects were drawn. The California Test of Mental Maturity (CTMM) was administered to all of the 850 students in these two grades as a part of the study. Only those who attained an IQ of 110 or over on the Language section of the test, using published norms, were considered potential subjects. Any student who performed at this minimum level or higher and who had achieved a cumulative high school grade point average (GPA) of 2.7 or below on a 4-point scale was considered an underachiever. Only academic subjects were used in computing these averages. The selection of 2.7 as a cutting point was based on the fact that it approximated the mean cumulative GPA on the tenth and eleventh grade classes. A student was considered an achiever if his cumulative high school GPA was 3.0 or higher. Table 1 reports the number of children identified in each category.

TABLE 1

NUMBER OF PARTICIPATING STUDENTS AND PARENTS CLASSIFIED BY GRADE, SEX, AND ACHIEVEMENT LEVEL

Achievement level	Students		Parents	
	Grade			
	10	11	Mothers	Fathers
Male achievers	17	14	22	21
Male underachievers	23	13	28	21
Female achievers	18	15	28	19
Female underachievers	8	7	8	4

Following the identification of subjects, their parents were contacted, first by letter, then by telephone, to request their participation in the study. This participation involved coming to the school in the evening and participating in an individual interview and in the completion of several objective inventories including the Parent Attitude Research Inventory (PARI). Parents were not informed that it was a study involving academic achievement, but were told only that children in the top 25%, with respect to ability, were being studied. The time that any parent was involved ranged from 2 to 4 hours. Table 1 reports the number of mothers and fathers in each of the eight categories studied who completed all project requirements.

An examination of Table 1 reveals that cooperation was generally better from mothers than from fathers and from the parents of achievers than from the parents of underachievers. The fathers of female underachievers were the most reluctant group. A total of 151 parents completed the necessary procedures. The size of the sample did not permit socioeconomic stratification. Inspection of data relative to occupational level of fathers indicated a tendency for underachievers to come from families lower on the occupational scale, but marked overlap between achiever and underachiever groups was also obvious.

The PARI was used as a measure of attitude. It was developed by Schaeffer, Bell, and Bayley (1958) and has been used extensively. There are forms for both mothers and fathers. The Mother Form of the inventory consists of 23 factored scales of 5 items each with the items cyclically arranged on the question blank. The Father Form consists of 30 factored scales of 8 items each, with items also cyclically arranged. These scales have the advantage of covering, in an objective way, a wide range of parent attitudes and also of presenting data in a manner which makes statistical treatment easily possible. Four categories of answers ranging from strongly agree to strongly disagree are possible. In the present study, IBM answer sheets were provided for parents to respond on.

The PARI was administered to each parent following a lengthy individual interview. The subject of the interview was the particular underachieving child included in the sample, and instructions to parents with respect to completing the PARI were that they should complete it with this particular child in mind. Following the administration of the PARI to all parents who participated in the study, answer sheets were scored on each scale and mean scores were computed for each group included in the study. In addition, the three factors isolated by Zuckerman and Ribback (1958) from the Mother Form of the inventory were scored and comparisons were made between mothers of achievers and underachievers on each of the factors.

For purposes of comparison, the fathers of male achievers were compared with fathers of male underachievers, and the fathers of female achievers were compared with the fathers of female underachievers, although in the latter case the number of fathers involved is so small as to make the reliability of results open to question. The mothers of male achievers were compared with the mothers of male underachievers and the mothers of female achievers were compared with the mothers of female underachievers. This kind of breakdown for comparative purposes seemed appropriate in the light of previous studies indicating differences in the dynamics of underachieving behavior between males and females. The F test to determine homogeneity of variance and the t test of significance were carried out between appropriate groups. When F was significant at the .05 level or less, t was computed by a method suggested by Cochran and Cox (1950) described by Edwards (1950).

RESULTS

Table 2 reports the scales on which significant differences were found between the mothers of female achievers and female underachievers. Differences significant at the .05 level or less were found on Scale 2, Fostering Dependency; Scale 5, Martyrdom; Scale 6,

TABLE 2

PARI SCALES ON WHICH DIFFERENCES BETWEEN MOTHERS OF FEMALE SUBJECTS WERE SIGNIFICANT AT THE .05 LEVEL OR LESS

Scale number	Achievers' mean	Under-achievers' mean	F	t
2	9.07	13.75	5.36***	2.50**
5	7.21	12.50	7.92****	2.94**
6	12.61	16.25	1.64	2.93****
11	11.04	14.38	1.54	2.23**
12	9.89	13.14	1.54	3.19****
16	8.75	11.00	1.94	2.15**
17	9.62	13.71	1.58	2.80****
19	9.57	14.88	1.21	4.09****
22	10.30	13.88	2.88	3.39****
23	9.56	12.13	1.19	2.05**

[a] When F was significant at the .05 level or less, t was obtained by an approximation suggested by Cochran and Cox (1950).

* $p = .05$.
** $.05 > p > .02$.
*** $.05 > p > .01$.
**** $p = .01$.

Fear of Harming the Baby; Scale 11, Deification of the Parent; Scale 12, Suppression of Aggression; Scale 16, Avoidance of Communication; Scale 17, Inconsiderateness of the Husband; Scale 19, Ascendancy of the Mother; Scale 22, Acceleration of Development; and Scale 23, Dependency of the Mother. In all cases the mean scores of the mothers of female underachievers exceeded the mean of the mothers of achievers.

Table 3 summarizes scales which differentiated significantly between the mothers of male achievers and male underachievers. It will be readily seen that in this case only two scales differentiated significantly. These were Scale 3, Seclusion of the Mother; and Scale 18, Suppression of Sexuality. In both cases the means obtained by mothers of underachievers were larger.

The three factors derived by Zuckerman (1958) in a previous study were used as a basis for further analysis. Factor A, an Authoritarian Control factor, seems to measure authoritarian suppression and punitive and restricting attitudes, according to Zuckerman. Factor B, a Hostility Rejection factor, is described as measuring hostility toward children and husband and rejection of the maternal role. Factor C, a Democratic Attitude factor, is composed of the three positively worded scales and seems to measure democratic attitudes. The only difference was found between the mother of female subjects, with the mothers of underachievers scoring significantly higher on Factor A. Factors B and C did not differentiate between the two groups. Table 4 summarizes these results. When similar techniques were applied to the mothers of male subjects included in the group, no significant differences were found between the mothers of male achievers and the mothers of male underachievers on any of the three

TABLE 3

PARI SCALES ON WHICH DIFFERENCES BETWEEN MOTHERS OF MALE SUBJECTS WERE SIGNIFICANT AT THE .05 LEVEL OR LESS

Scale number	Achievers' mean	Under-achievers' mean	F	t
3	10.55	12.54	1.26	2.48**
18	7.85	9.74	1.02	2.21*

* $.05 > p > .02$.
** $.02 > p > .01$.

TABLE 4

RESULTS OBTAINED ON MOTHERS OF FEMALE SUBJECTS FROM PARI SCALES ANALYZED ACCORDING TO ZUCKERMAN'S FACTORS

Factor	Achievers' mean	Under-achievers' mean	F	t
A	9.87	13.23	1.63	4.50**
B	10.83	12.50	2.44*	.14
C	17.27	17.25	1.65	.02

* $.05 > p > .02$.
** .01.

TABLE 5

RESULTS OBTAINED ON MOTHERS OF MALE SUBJECTS FROM PARI SCALES ANALYZED ACCORDING TO ZUCKERMAN'S FACTORS

Factor	Achievers' mean	Under-achievers' mean	F	t
A	10.12	11.24	1.21	1.24
B	10.91	11.64	1.01	.90
C	17.13	16.96	1.40	.31

factors. Table 5 summarizes these results.

Analysis of the PARI scores obtained from the fathers of female subjects was carried out in a manner similar to that used for the mothers of our subjects. Application of F and t tests to the mean scale scores obtained by the fathers of female subjects revealed significant differences on four scales. These were Scale 7, Marital Conflict; Scale 18, Suppression of Sexuality; Scale 22, Avoidance of the Expression of Affection; and Scale 28, Change Orientation. These results are summarized in Table 6.

Analysis of the PARI scale for the fathers of males included in the study revealed only two scales which differentiated significantly between the two groups. These were Scale 18, Suppression of Sexuality; and Scale 12, Irresponsibility of the Father. These results are indicated in Table 7.

TABLE 6

PARI SCALES ON WHICH DIFFERENCES BETWEEN FATHERS OF FEMALE SUBJECTS WERE SIGNIFICANT AT THE .05 LEVEL OR LESS

Scale number	Achievers' mean	Under-achievers' mean	F	t
7	24.89	19.75	2.67	2.39*
18	13.16	19.50	3.31	3.41**
22	15.21	21.00	1.29	3.29**
28	18.65	22.75	1.36	2.13*

* $.05 > p > .02$.
** $p = .01$.

TABLE 7

PARI SCALES ON WHICH DIFFERENCES BETWEEN FATHERS OF MALE SUBJECTS WERE SIGNIFICANT AT THE .05 LEVEL OR LESS

Scale number	Achievers' mean	Under-achievers' mean	F	t
12	14.94	17.75	2.44*	1.54[a]**
18	14.69	18.40	1.09	2.35**

[a] When F was significant at the .05 level or less, t was obtained by an approximation suggested by Cochran and Cox (1950).
* $p = .05$.
** $.02 > p > .01$.

DISCUSSION

Examination of the results obtained from analysis of the data on mothers of our female subjects revealed 10 scales which differentiated significantly between the mothers of achievers and underachievers. To a greater extent than the mothers of female achievers, the mothers of our female underachievers appear to be more dependent, dominant, and in need of respect and the dependency of their children. They seem to have some fear of their own hostile impulses and cannot tolerate the agressive behavior of their children.

Results obtained from the mothers of male subjects are not nearly so definite. The only two scales which differentiated significantly between the mothers of male achievers and underachievers were the Seclusion of the Mother and Suppression of Sexuality scales. The mothers of underachieving males appear to be both more seclusive and to suppress sexuality more strongly than the mothers of male achievers.

Analysis of the data obtained from the mothers using Zuckerman's three factors tends to be in line with the findings reported above. The mothers of female subjects showed significant differences on only one of the three factors. On Factor A, the mothers of underachieving

girls exceeded significantly the scores obtained by the mothers of achieving girls. This is not at all surprising in view of the fact that the 10 scales on which the mothers of underachieving females receive significantly higher scores are all included in the 16 scales which make up Factor A. No differences were found between the two groups on Factors B and C. These results would seem to indicate that the mothers of female underachievers were dependent, dominant, and felt put upon in their roles of wives and mothers. They could not tolerate the expression of aggression on the part of their children and, at the same time, feared their own hostile impulses.

No differences were found on any of the three factors between the mothers of male achievers and underachievers. Apparently, among the subjects in our sample, negative feelings were most strongly exhibited by the mothers of female underachievers.

Results obtained from the fathers of female subjects were somewhat equivocal. The fathers of female achievers expressed significantly more strongly the feeling that marital conflict existed in their family. It is interesting to note in this regard that none of the mothers of these same children expressed this feeling to a significant degree. The fathers of underachieving females exceeded the fathers of achieving females on three scales: Suppression of Sexuality, Avoidance of the Expression of Affection, and Change Orientation. Interpretation of these findings leads to the conclusion that the suppression of overt demonstrations of emotion is accompanied in these fathers by a suppression of any behavior which to them implies sexuality. There is some basis for assuming a relationship between these two variables. The high score of these fathers on change orientation may indicate the existence of a subtle dissatisfaction with the role of husband and parent.

The fathers of male subjects differed significantly on two scales, and in both cases, the fathers of underachievers exceeded the fathers of achievers. These scales were Irresponsibility of the Father and, again, the Suppression of Sexuality. The suggestion of a basic anxiety with respect to sexual matters among the parents of underachieving children is strongly borne out. Again, there is a hint of dissatisfaction with the parental role on the part of the parents of underachievers.

It would appear that parents of underachieving children have more strongly negative attitudes toward these particular children than do the parents of achieving youngsters. The present study does not reveal definitely, however, whether these attitudes are one of the results of underachievement, or one of its causes. From a logical point of view, it is easier to build a case for such attitudes as causal rather than resultant factors. The early appearance of underachievement among males lends some support to the causal interpretation. The finding of negative self-concepts among underachievers (Shaw, Edson, & Bell, 1960) also is mildly supportive of parental attitudes as causal factors since negative attitudes on the part of parents toward a child would result in the formation of negative attitudes toward self on the part of the child. The problem of why only certain children in the same family are underachievers has not been explored, although presumably it is related to the fact that parents have different attitudes toward their various children. This is a problem which should not be too difficult to explore, from a methodological point of view. In the present study an effort was made to establish a response set relative to the *specific* child under consideration.

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(Received April 2, 1962)

Journal of Educational Psychology
1962, Vol. 53, No. 5, 209–213

THE DIMENSIONS OF ATTITUDES TOWARD TEACHERS AS MEASURED BY THE SEMANTIC DIFFERENTIAL

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To investigate the dimensionality of attitudes of education students toward teachers, a form of the Semantic Differential was administered to 259 Ss in an educational psychology course. 1 concept (school teachers) was rated on each of 117 scales. A factor analysis was performed on the resulting data. A large factor of general Evaluation was obtained, and this factor included such attributes as potency and activity—attributes which have often defined their own factors. Other factors, including ones tentatively labeled as Restraint, Tenacity, Predictability, and Stability were also obtained and discussed.

The measurement of attitudes toward teaching and the teaching profession is an important area of interest in education for a number of reasons. These include educators' concern about students' attitudes toward teaching because of the importance of recruiting superior students to the profession of education; the need to assess attitudes toward the many innovations being introduced throughout the profession; and, of course, the fact that educators tend to be a self-conscious lot.

The Semantic Differential (Osgood, Suci, & Tannenbaum, 1957), a flexible and easy-to-score technique developed for assessing "connotative meaning," is a particularly appropriate and increasingly popular one for the measurement of attitudes. Some of the early research done with the Semantic Differential suggested that there were three major factors in the meaning space: Evaluation, Potency, and Activity. This beautiful simplicity has been one of the reasons for the speed of its adoption in attitude research. Although other early research on the technique (Osgood et al., 1957) did not result in the same gratifyingly simple factor structure, there was a great deal of similarity in the results of all the studies.

This easily gave the impression that the Semantic Differential was a test which could measure the essential dimensions of meaning and attitude, rather than a technique appropriate for the measurement of attitudes.

The distinction between a test and a technique is an important one. In the context of this paper, *test* is used to mean a relatively fixed set of items, scored by a relatively fixed scoring system. *Technique* is used to mean an approach to the measurement of some attributes—an approach that has to be modified to fit the particular subject matter under investigation. Attitude measurement is a complicated problem. The seeming objectivity of the scoring system (if the three dimensions of meaning are used) makes the Semantic Differential particularly enticing as a test of attitudes. It is difficult to disregard the appeal of a single set of items that can be unambiguously scored on a small number of factors objectively obtained through factor analysis. However, the objective nature of the scoring can lead to some disregard for the appropriateness of the scoring keys for the problem under study.

Many studies with the Semantic Differential used "concepts" representing

fairly heterogeneous subject matters. The factor structures obtained from studies with a heterogeneous set of concepts and scales tend to be similar to each other and to the one mentioned above. This would not necessarily be true with a homogeneous set of concepts. The point of this paper is that investigations into attitudes toward teaching and the teaching profession must consider the nature of the factor structure particular to the domain under study. This is not a new point and it is certainly one with which the developers of the Semantic Differential have been concerned. But it is, unfortunately, a point with which some researchers in educational circles do not seem to be familiar. Therefore it should be emphasized that the Semantic Differential is a technique, *not* a test. As an illustration of this point, the results of a preliminary study examining the dimensionality of attitudes toward teachers are presented.

METHOD

Subjects

The subjects of the study were 259 students in the introductory course in educational psychology at the University of California, Los Angeles. Of these, 113 were enrolled in the section for elementary school teaching, and 146 in the secondary school section.

Testing Materials

The test booklet followed the ordinary format for the Semantic Differential. The instructions were modified only slightly from those suggested by Osgood et al. (1957). One concept (school teachers) and 117, seven-step, bipolar scales were used. The scales were selected to represent a diverse set of dimensions appropriate to teaching.

Procedure

During a regular class period, the subjects were informed that they were participating in a study of attitudes towards teachers, told to read the instructions, and then directed to proceed with the rest of the booklet. Particular stress was laid on that part of the instructions which asked that they not spend more than a few seconds marking each scale. All the subjects were given sufficient time to complete the booklet.

RESULTS

Means and standard deviations for each scale were obtained.[1] The responses on the scales were intercorrelated, resulting in a 117×117 matrix of intercorrelations. For purposes of a factor analysis, the number of scales was cut to 80. This was done subjectively by eliminating items with extremely low variance or with great similarity to other scales in the study.

The resulting 80×80 matrix of intercorrelations was subjected to a principal components factor analysis.[2] Fifteen factors had eigenvalues greater than unity and these were selected for rotation (Kaiser, 1960), and were then orthogonally rotated using the varimax technique (Kaiser, 1958). Five were deemed appropriate for interpretation. The other factors seemed too specifically defined by semantic similarities among scales, too small, or too confusing for extensive consideration.[3]

[1] The means and standard deviations obtained in this study indicated that the attitudes of the students toward public school teachers was in general extremely positive. For example, the arithmetic mean of the 13 scales in Table 1 was 2.19, on a 7-point scale, with 1 indicating the most positive evaluation and 7 the most negative evaluation. Perhaps this is true because of the attitude structure of the students or perhaps it is true because the students were in an education class and tended to give positive responses in that situation because they felt these positive responses were expected of them. The data in this study do not permit a choice between these alternatives.

[2] The authors would like to express their appreciation to the Western Data Processing Center for performing the data analysis reported in this paper.

[3] A 9-page document containing the complete list of scales used in the study along with the means, standard deviations, and rotated factor

TABLE 1

FACTOR 1: GENERAL EVALUATION

Scales	Loading
Confident-scared	.830
Sensible-foolish	.797
Energetic-lethargic	.776
Good-bad	.744
Cheerful-melancholy	.739
Strong-weak	.728
Social-unsociable	.715
Fast-slow	.701
Informed-uninformed	.698
Creative-unimaginative	.697
Decisive-undecisive	.696
Sociable-withdrawn	.696
Active-passive	.692

Note.—For lack of space, only those scales with a loading of .690 or above are presented here.

The first factor seemed clearly to be a General Evaluation factor. It accounted for the largest proportion of variance (24% of the total variance and 39% of the common variance). The most interesting aspect of this factor was that it was a *general* Evaluation factor. The attitudes expressed by the subjects did not display much structuring. Separate dimensions of Evaluation, Activity, and Potency did not develop. Those who rated school teachers as "good" also rated them as active and strong, creative, decisive, informed, witty, confident, cheerful, sociable, and sensible.

The second factor was named Restraint (see Table 2). The development of this factor from the correlations suggested that the dimension of Restraint was independent of that of Evaluation.

loadings for the scales on the five factors discussed in the text has been deposited with the American Documentation Institute. Order Document No. 7263 from ADI Auxiliary Publications Project, Photoduplication Service, Library of Congress; Washington 25, D. C., remitting in advance $1.25 for microfilm or $1.25 for photocopies. Make checks payable to: Chief, Photoduplication Service, Library of Congress.

TABLE 2

FACTOR 2: RESTRAINT

Scales	Loading
Reserved-open	.710
Introverted-extroverted	.576
Restrained-free	.549
Quiet-talkative	.476
Quiet-boisterous	.469
Reserved-open	.441
Controlled-spontaneous	.317

Note.—All scales with loadings above .30 are presented in the tables for Factors 2, 3, 4, and 5.

Quiet, introverted, reserved, restrained, and controlled were the positive poles of the prominent scales for this dimension, which accounted for 4% of the total variance and 6% of the common variance.

The third factor was called Tenacity (see Table 3). The scale named controlled-spontaneous appeared here as it did in Factor 2. However, the pattern of loadings suggested that the control implied in Factor 3 was not the same as the control of interpersonal behavior implied in Factor 2. Instead the control here seemed to be one of rigidity, stubbornness, and lack of imagination. This factor accounted for 3% of the total variance and 4% of the common variance.

Predictability seemed to be an appropriate name for Factor 4 (see Table 4). The positive pole of this factor was defined in terms of understandability, predictability, sobriety, frankness, polite-

TABLE 3

FACTOR 3: TENACITY

Scales	Loading
Tenacious-yielding	.740
Stubborn-yielding	.560
Controlled-spontaneous	.369
Rigid-flexible	.331
Unimaginative-imaginative	.308

TABLE 4

Factor 4: Predictability

Scales	Loading
Sober-frivolous	.548
Frank-secretive	.515
Predictable-unpredictable	.466
Polite-rude	.447
Understanding-mysterious	.410
Quiet-boisterous	.392
Objective-subjective	.390
Admired-disliked	.323

ness, and objectivity. This factor accounted for 4% of the total variance and 6% of the common variance.

A cluster of scales related to Stability also developed as an independent dimension (see Table 5). Whereas Factor 4 seemed to emphasize understandability, the positive pole of Factor 5 was more related to such attributes of teachers as calmness, lack of emotion, stability, and objectivity. This factor accounted for 3% of the total variance and 5% of the common variance.

Several other findings should be mentioned, even though they are not as clear as those already presented. One dimension, tentatively identified as Aggressiveness, appeared. Another independent dimension, Sensitivity, was suggested. An additional factor on which scales related to colorfulness, sophistication, and individualism had high loadings also developed; this dimension was tentatively described as Dynamism. The scale of altruism-egotism tended to define a dimension all by itself. None of these factors was very clear and strong. Further research, involving a different set of scales and an expanded set of concepts, is now in progress in an attempt to clarify the situation.

TABLE 5

Factor 5: Stability

Scales	Loading
Calm-excitable	.658
Objective-subjective	.608
Stable-changeable	.589
Unemotional-emotional	.359
Trusting-suspicious	.358
Quiet-talkative	.324

Conclusions

Two aspects of the results stand out. The first is that an overall Evaluation factor emerged, seeming to define all that is related to ratings of goodness in school teachers and including not only scales such as good-bad but also scales relating to potency, activity, and sociability. Separate dimensions of Potency, Activity, and Sociability did not develop. This finding is of interest, particularly as an illustration of the necessity of examining the structure of a subject matter area before utilizing measurement instruments for research in that area.

The second finding of special interest is that ratings of sociability and being liked were included under the umbrella of Evaluation, whereas scales reflecting predictability and stability, among others, tended to establish themselves as separate dimensions. Since the subjects were education students who planned to become teachers, it was not surprising that the Evaluation dimension itself included so many attributes. What is of interest is the nature of the dimensions that emerged; ratings reflecting social behavior are aspects of Evaluation, but ratings reflecting the predictability or stability of the teacher are parts of separate dimensions. Perhaps the other-directed nature of our society intrudes even into the dimensionality of attitudes toward public school teachers. It is also certainly possible that scales such as sociable-withdrawn loaded highly on the Evaluation factor because the subjects were planning to become teachers them-

selves and considered the teacher not only as a teacher but also as a co-worker.

Several limitations of the study should be mentioned. Since only one concept was used, the generality of the results of this study is limited. The factor structure may change when more concepts are used and the results of this research are utilized to define another set of scales for the next study. However, it is highly improbable that in the relatively homogeneous domain of attitudes toward public school teachers the general Evaluation factor will break down into Activity, Potency, and Evaluation dimensions.

The results of this study should *not* be construed as identifying the relative importance of dimensions of attitudes toward teachers. Factor analysis helps to structure the domain; it does not determine the importance of the parts. This can only be determined by other research. What can be said, however, is that education students apparently seem to treat the dimensions of Restraint, Tenacity, Predictability, and Stability as independent of the general dimension of Evaluation in their ratings of teachers.

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(Received January 17, 1962)

Journal of Educational Psychology
1962, Vol. 53, No. 5, 214–218

THE EFFECTS OF AN ABNORMAL PSYCHOLOGY COURSE ON STUDENTS' ATTITUDES TOWARD MENTAL ILLNESS [1]

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The Opinions about Mental Illness Scale was administered at the beginning and end of the semester to an abnormal psychology class (38 men, 32 women) and to a control class of sociology students (60 men, 67 women). 5 attitudes were measured: Authoritarianism, Unsophisticated Benevolence, Mental Hygiene Ideology, Social Restrictiveness, and Interpersonal Etiology. Analysis of covariance revealed that changes which could be attributed to the psychology course were as follows: (a) women became less authoritarian, (b) men achieving in the upper 50% of the class became less authoritarian and less restrictive than lower achieving men, and (c) men and women decreased their attitude of unsophisticated benevolence and increased their conviction that unhealthy interpersonal relations early in life frequently lead to mental illness.

Instructors generally agree that an important objective of a college course in abnormal psychology or mental hygiene is to bring about more favorable attitudes concerning mentally ill people and the nature of mental illness. Nevertheless, there have been very few attempts to evaluate specifically these kinds of attitudinal outcomes. This paper reports the results of an initial effort to do so.

METHOD

The instrument used to determine attitudes was the Opinions about Mental Illness (OMI) Scale. Developed by Cohen and Struening (1959, 1960) on the basis of factor analysis, the scale consists of 51 Likert-type items, and measures these five attitudes: Authoritarianism, Unsophisticated Benevolence, Mental Hygiene Ideology, Social Restrictiveness, and Interpersonal Etiology.[2] The authors of the OMI have reported that intercorrelations among attitude scores were under .30, except for the correlation between Authoritarianism and Mental Hygiene Ideology, which was —.39. They have also determined reliability coefficients of internal consistency for each of the five attitude subscales. For four of these the coefficients ranged from .49 for the Unsophisticated Benevolence to .82 for Authoritarianism, with coefficients for Mental Hygiene Ideology and Interpersonal Etiology being about .60. Social Restrictiveness scores had the lowest reliability coefficient, .21 (Cohen & Struening, 1960).

The OMI, accompanied by a brief personal information questionnaire, was administered at the beginning and end of the semester to 38 men and 32 women enrolled in an undergraduate course in abnormal psychology. Most of these students were juniors or seniors from a variety of colleges within the university. The class met three times a week for lectures, which were supplemented by films. Extraclass assignments included the reading of a standard textbook (Coleman, 1956) and the writing of a paper.

As a control procedure the OMI and personal information questionnaire were also given at the beginning and end of the semester to an introductory sociology class which met three times a week. The reason for testing this class was to measure the effect general university experiences, apart from taking abnormal psychology, might have on students' attitudes toward mental illness and mentally ill people. Twenty percent of the sociology students had never

[1] The data for this study were obtained at the University of Illinois with the cooperation of students and faculty of the Department of Psychology and the Department of Sociology. Financial assistance for scoring attitude scales and tabulating data was furnished by the Extension Division of the University.

[2] The authors of this scale have kindly granted permission for its use in this investigation.

taken a psychology course, while 10% had completed a course in abnormal psychology or mental hygiene. Students in these two categories were therefore eliminated from the study in order to make the control group's experience in psychology more like that of the abnormal psychology class. The remaining control students consisted of 60 men and 67 women. Most of them were juniors or seniors and resembled the psychology students in the variety of colleges in which they were enrolled.

Neither the psychology nor the sociology instructor was given any specific information concerning the kinds of attitudes which were being measured until all data were collected by the investigators.

RESULTS AND DISCUSSION

Analysis of covariance (Lindquist, 1953, pp. 317–330) was employed to discover whether or not changes in the abnormal psychology students' attitudes differed from those of the control students (Table 1), and also to determine differences in attitude changes between psychology students who achieved in the upper half of the class and those who achieved in the lower half (Table 2). Achievement was measured by classroom examinations and by papers prepared outside of class. Prior to dividing students into upper and lower halves, an analysis of achievement scores had revealed no significant differences between men and women.

Authoritarianism

A high score for this attitude indicates that mentally ill people are perceived as dangerous, unpredictable, and stigmatized. As Table 1 shows, psychology women became less authoritarian by the end of the course than did the control women. The postcourse difference between the attitudes of the psychology and the control men, however, was not significant. The comparison of achieve-

TABLE 1

ABNORMAL PSYCHOLOGY AND INTRODUCTORY SOCIOLOGY STUDENTS' ATTITUDES TOWARD MENTAL ILLNESS

Attitude	Precourse				Postcourse				Adjusted postcourse *M*		
	Psychology		Sociology		Psychology		Sociology		Psychology	Sociology	Difference
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*			
Authoritarianism											
Men	17.1	6.1	20.4	5.9	15.8	4.7	19.7	6.6	17.2	18.9	—1.7
Women	16.7	5.4	19.1	6.2	14.1	5.4	19.4	5.4	15.0	19.0	—4.0*
Unsophisticated Benevolence											
Men	56.6	5.3	52.0	5.1	50.6	4.8	52.3	5.2	49.1	53.4	—4.3*
Women	57.1	4.7	53.7	5.4	53.0	4.5	53.5	5.1	51.6	54.2	—2.6*
Mental Hygiene Ideology											
Men	32.2	4.5	32.0	5.0	33.4	4.1	32.1	4.7	33.3	32.1	1.2
Women	31.8	4.0	32.9	4.1	33.4	3.5	33.2	3.8	33.7	33.1	.6
Social Restrictiveness											
Men	18.6	3.7	19.9	5.2	18.7	4.6	19.9	5.6	19.1	19.6	—.5
Women	19.4	5.7	19.5	5.2	19.0	4.9	19.4	5.2	19.0	19.5	—.5
Interpersonal Etiology											
Men	19.3	4.9	17.7	4.3	21.3	3.9	17.4	5.4	20.6	18.8	1.8*
Women	17.4	4.1	17.4	4.5	19.8	4.7	17.4	4.3	19.8	17.4	2.4*

Note:—The higher the mean, the more intense is the attitude. Adjusted postcourse means were determined by analysis of covariance. *N*s are as follows: psychology men = 38, sociology men = 60, psychology women = 32, and sociology women = 67.

* $p < .01$.

TABLE 2

ABNORMAL PSYCHOLOGY STUDENTS' PRECOURSE AND POSTCOURSE ATTITUDES TOWARD MENTAL ILLNESS ACCORDING TO THEIR LEVEL OF COURSE ACHIEVEMENT

Attitude	Precourse				Postcourse				Adjusted postcourse *M*		
	Upper		Lower		Upper		Lower		Upper	Lower	Difference
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*			
Authoritarianism											
Men	16.5	6.1	17.7	5.9	13.8	3.9	17.7	4.6	14.0	17.6	—3.6*
Women	14.5	4.3	18.8	5.5	12.4	4.8	15.8	5.3	13.3	14.9	—1.6
Unsophisticated Benevolence											
Men	57.5	5.7	55.7	4.7	52.0	5.1	49.3	4.0	51.5	49.8	1.7
Women	57.2	3.9	56.9	5.4	53.3	4.0	52.8	4.9	53.2	52.8	.4
Mental Hygiene Ideology											
Men	32.6	3.5	31.7	5.2	34.1	4.2	32.7	4.0	33.9	33.0	.9
Women	31.4	4.0	32.3	3.8	32.9	3.6	33.9	3.4	33.1	33.7	—.6
Social Restrictiveness											
Men	18.7	5.3	18.6	5.7	16.7	4.6	20.6	5.1	16.7	20.7	—4.0**
Women	17.4	3.8	21.4	6.4	16.6	3.6	21.4	4.9	17.5	20.5	—3.0*
Interpersonal Etiology											
Men	18.8	4.2	19.8	5.3	21.2	4.6	21.4	2.9	21.4	21.2	.2
Women	17.9	4.1	17.0	3.8	19.8	4.2	19.8	5.2	19.5	20.1	—.6

Note:—The higher the mean, the more intense is the attitude. Adjusted postcourse means were determined by analysis of covariance. *N*s are as follows: upper men = 19, lower men = 19, upper women = 16, lower women = 16.

* $p \leq .05$.

** $p < .01$.

ment groups (Table 2) revealed that women who achieved in the upper half of the psychology class did not differ significantly in their postcourse attitudes from lower achieving women. In contrast, upper achieving men did end the course with a significantly less authoritarian attitude than lower achieving men.

Unsophisticated Benevolence

The higher the score for this attitude, the stronger is the feeling that mentally ill people should be treated kindly but paternalistically, as if they were unruly children who needed gentle care and supervision. Men as well as women in the psychology class decreased their attitudes of Unsophisticated Benevolence, since their postcourse mean scores were significantly less than those of the corresponding control groups (Table 1). No postcourse differences occurred between the psychology achievement groups (Table 2).

Mental Hygiene Ideology

This attitude represents the historical position of the mental hygiene movement, with high scores reflecting humanitarianism, "tendermindedness," and acceptance of the belief that mental illness can be treated successfully. No postcourse differences occurred between the psychology and the control groups (Table 1), or between the psychology achievement groups (Table 2).

The failure of the abnormal psychology students to change in their Mental Hygiene Ideology was an unexpected finding for the investigators. An examination of the OMI items which measured

this attitude suggested that the lack of change might be a function of the relatively vague relationship between the concepts involved in these items and the conceptual content of the psychology course. Perhaps, too, more than a single semester is essential for such "ideological" changes to take place.

Social Restrictiveness

The focus of this attitude is on the necessity for closely restricting the activities of mentally ill people, whether or not they are in hospitals, in order to protect society and particularly the family. No postcourse differences in attitude emerged between the psychology and the control groups (Table 1). Men whose achievement was in the upper half of the psychology class, however, became less restrictive than lower achieving men; similarly, upper achieving women ended the course being less restrictive than lower achieving women (Table 2).

Interpersonal Etiology

The higher the score for this attitude, the more is the agreement that unhealthy interpersonal relationships, especially love deprivation early in life, are basic forerunners of mental illness. Table 1 shows that men as well as women in the psychology class made significantly greater gains in their mean scores for this attitude than did the corresponding control groups. No postcourse differences occurred, however, between the attitudes of the upper achieving and lower achieving groups in psychology (Table 2).

Correlations between Precourse and Postcourse Attitudes

Considering all five attitudes, correlations between precourse and postcourse attitude scores, which have not been listed in the tables, ranged from .44 to .65 for the psychology students, averaging .52; for control students the correlations ranged from .46 to .78, averaging .63. Tests of significance between r's, using Fisher's z function for transforming the coefficients, (Lindquist, 1940, pp. 214–217), revealed two differences, both at the .05 level: (*a*) men in the psychology class made greater shifts in the relative position of their authoritarian scores than did men in the control class (.44 versus .76), and (*b*) women in the psychology class made greater shifts in the relative position of their interpersonal etiology scores than did women in the control class (.46 versus .78).

CONCLUSIONS

The results of this investigation showed that a course in abnormal psychology effectively changed in a desirable direction students' attitudes toward mental illness and mentally ill people. While certain of these modifications were related to the learning of information taught in the course, some change occurred for low as well as for high achievers. This latter finding points up the importance of measuring specifically the kinds of attitudinal outcomes which a psychology course is expected to bring about, rather than inferring such changes from course grades alone.

Since this study was based on a particular abnormal psychology course, further research of this nature needs to be carried out. Different emphases on subject matter, different teaching approaches, and personal characteristics of students could be considered in assessing attitudinal changes. As a step in this direction the investigators are presently attempting to determine the effects of graduate courses in mental hygiene

on the attitudes of teachers and educational administrators. It is hoped that other researchers may also carry out studies concerned with students' attitudes toward mental illness, so that as such knowledge grows instructors of courses in abnormal psychology, mental hygiene, and related fields may gain a better understanding of the attitudinal effects of the courses they teach, and what can be done to facilitate these changes.[3]

[3] Investigators wishing to obtain a copy of the OMI Scale and its scoring procedure may do so by writing to Frank Costin, Student Counseling Service, University of Illinois, Urbana.

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(Received February 4, 1962)

Journal of Educational Psychology
1962, Vol. 53, No. 5, 219–223

A FACTOR ANALYSIS OF STUDENTS' AND ADMINISTRATORS' RATINGS OF CLINICAL TEACHERS IN A MEDICAL SCHOOL [1]

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This analysis of ratings of 21 clinical teachers of medicine by administrators and students revealed 3 major factors: (a) the teacher's attitude toward patients and students, (b) the instructor's use of various teaching techniques, and (c) a factor estimating a teacher's knowledge. Only the 1st 2 factors influenced student rankings, although an appreciation of the 3rd is indicated. The administrators, however, were influenced only by the 3rd. The present results resemble those of previous efforts to analyze conceptions of teacher effectiveness through factor analyses of ratings (Ryans, 1960). To this extent, the concepts of affective and cognitive merit—coordinate with the affective and cognitive domains of the *Taxonomy of Educational Objectives* (Bloom, 1956)—are given added support.

This study had its origins in problems that are encountered in the daily administration of a program of clinical teaching in a medical school. The keystone of such a clerkship program is the case-study method (Cotsonas, 1957) —a method which requires the teacher to determine and meet the needs of the individual student. It seems reasonable to assume that a teacher who undertakes this sort of individual centered instruction should be familiar with the thought processes, prejudices, and fears of the students he teaches; and should be made aware of the effect of his attitudes, his teaching, and his knowledge on students.

Therefore, it was desired to devise some method of sampling students' reactions to their teachers. Initially, we provided the students with blank paper and invited comments on any and all aspects of their clinical instruction. From these comments we developed a questionnaire which would sample more systematically the students' reactions to their teachers regarding many phases of clinical teaching and learning.

In the present paper we wish to discuss results of the application of this questionnaire and also to contrast the students' reports with those made by the administrators (four members of the full-time faculty most actively concerned with the training program) of the clinical program.

Questionnaire

The length of the questionnaire precluded inclusion in the manuscript.[4] The substance of each question has been abstracted and included in Table 1. Note that the 35 items were divided logically into 5 areas: Personal Qualities (Items 1–13), Teaching Techniques (Items 14–19), Actual Teaching Session (Items

[1] The writers are indebted to H. F. Dowling, N. L. Gage, and J. T. Hastings for helpful consultation in the preparation of this paper.

We are also indebted to E. Eckert for all computations exclusive of the factor analysis. The factor analytic computations were done on Illiac, an electronic computer of the Digital Computer Laboratory of the University of Illinois.

[2] Now at the College of Medicine, Chicago.
[3] Now in the Departments of Education and Psychology, Urbana.

[4] Copies of the questionnaire are available on request from the authors; the essence of the items is contained in Table 1.

20–26), Teaching by Example (Items 27–30), and Knowledge (Items 31–35).

In addition, at the time the questionnaire was administered, students were asked two summary questions intended to force an overall judgment of their teachers. The first of these summary questions (Item 44) was, "How would you rate this instructor?" (A, B, C, D, E) and the second summary question (Item 45) was, "Would you pick this instructor for your best friend who is about to take the course?" (Yes or No). Further unstructured comments were also invited.

Preliminary Results

The questionnaire was administered at the end of 3 successive years to all juniors (approximately 600 medical students) in the medical clerkship at Cook County Hospital, Chicago, on wards supervised by the University of Illinois, College of Medicine. The evaluations of 21 clinical teachers on whom there were at least three students' comments for the 3 successive years are the basic data of this study. The scoring procedure was as follows: each of the 35 items in the questionnaire was scored Good = 2, Fair = 1, Poor = 0. The first summary question was scored A = 4, B = 3 . . . E = 0; and the second summary question was scored as the percentage of students who responded "Yes." Two persons unfamiliar with the teachers and the students, graded the unstructured comments: 3 points if the comments were deemed completely favorable, 2 points if the criticism was mixed but predominantly favorable, 1 point if the criticism was mixed but predominantly unfavorable, and 0 points if the criticism was completely unfavorable. Each teacher was rated by 12–64 students; and a teacher's score on the individual questionnaire items, summary questions, and unstructured comments was determined by averaging over those students rating him. A total score for each teacher was given by summing the average item scores over the 35 questionnaire items.

It is obvious that the present procedure is unusual, as compared with other rating schemes. In particular, the individual teachers were rated by different groups of students. This arrangement is intrinsic to the situation because typically only one or two students go on "rounds" with a clinical teacher. Despite any distortions that may have resulted from this procedure, the majority of our subsequent analyses, as will be seen, yielded readily interpretable results.

The correlation of the total score (over the 35 questionnaire items) with the summary question, "How would you rate this instructor?" was .93; with the summary question, "Would you pick this instructor for your best friend who is about to take the course?" it was .86; and with the quantitative rating of the unstructured comments it was .50. These coefficients suggest that the total score on the questionnaire is measuring some sort of general or overall ability of the teachers. Because the nature of this general ability was hard to understand and because we had hoped to distinguish between different dimensions of teacher performance (e.g., the items had originally been subdivided logically into five groups) it was decided to explore the internal structure of the questionnaire by subjecting the score data to an interitem factor analysis.

Factor Analytic Results

In a preliminary factor analysis the principal components (Hotelling, 1933) of the interitem correlation matrix of the questionnaire items were extracted. The components associated with latent roots greater than one were rotated or-

thogonally according to the varimax criterion (Kaiser, 1958). This analysis revealed two distinct factors which accounted for over half the total variance. (The remaining rotated factors were so small as to be uninterpretable.) The two major factors were readily interpreted as an Attitude factor and a Teaching factor. More detailed bases for this interpretation will be given below in our description of a more extensive factor analysis in which these two factors were reproduced almost exactly.

The factor analysis to be reported in detail in this paper was based on 56 variables. The first 35 variables were the individual questionnaire items which had been subjected to the exploratory factor analysis mentioned in the previous paragraph. Eight additional composite variables (36–43) from the students' questionnaires were included: Item 36: Subgroup I, Personal Qualities —determined by adding scores on Questionnaire Items 1–13; Item 37: Subgroup II, Teaching Techniques—determined by adding scores on Questionnaire Items 14–19; Item 38: Subgroup III, Actual Teaching Session—determined by adding scores on Questionnaire Items 20–26; Item 39: Subgroup IV, Teaching by Example—determined by adding scores on Questionnaire Items 27–30; Item 40: Subgroup V, Knowledge—determined by adding scores on Questionnaire Items 31–35; Item 41: A subgroup intended to measure Teacher-Patient Relationships—determined by adding scores on Questionnaire Items 1, 4, 28, and 29; Item 42: A subgroup intended to measure Teacher-Student Relationships—determined by adding scores on Questionnaire Items 14, 19, 21, 24, 25, and 26; Item 43: The total score on the 35-item questionnaire.

Admittedly, these 8 variables are all linearly dependent on the first 35 and thus do not provide new information; however, they were included because it was desired to see their loading patterns explicitly.

The final three variables (Items 44–46), derived from students' responses, were scores on the two summary questions and the rating of the unstructured comments.

During the 3-year period in which the student ratings of their teachers were being gathered, we also secured administrators' rankings of the same teachers. Each of the four administrators of the clinical training program was asked to rank the 21 teachers from highest to lowest on each of eight variables.

The eight variables (Items 47–54) on which the teachers were rated by the administrators were those embodied in Variables 36–43: Personal Qualities, Teaching Techniques, Actual Teaching Session, Teaching by Example, Knowledge, Teacher-Patient Relationships, Teacher-Student Relationships, and Overall Performance. A teacher's score on any one variable was taken as the average rank assigned him by the administrators.

The administrators also responded to the two summary questions, "How would you rate this instructor?" (A, B, C, D, E) and, "Would you pick this instructor for your best friend who is about to take the course?" (Yes or No). The average response of the four administrators to these questions constituted final Variables 55 and 56 of the present study.

The 9 principal components with latent roots greater than 1 of the intercorrelation matrices of the 56 variables were extracted and then rotated according to the varimax criterion. Three substantial, intepretable factors emerged. The results of the analysis are exhibited in Table 1.

In interpreting the three factors, we were aided particularly by a considera-

TABLE 1

VARIMAX FACTORS OF STUDENTS' AND ADMINISTRATORS' RATINGS OF MEDICAL SCHOOL CLINICAL TEACHERS

Variable	A	B	C
1. Uses humor well with patients	91[a]	02	11
2. Uses humor well with students	92[a]	03	14
3. Charm and personal magnetism for students	92[a]	15	08
4. Charm and personal magnetism for patients	92[a]	−04	18
5. Dramatizes the case with lively discussion	12	88[a]	10
6. Inspires student to maximum effort	23	75[a]	16
7. Sympathetic to and fair with students	91[a]	08	07
8. Punctuality	15	38	25
9. Energetic and forceful	−02	35	10
10. Gains cooperation of students	73[a]	35	23
11. Polite	68[a]	19	02
12. Conceit of teacher didn't interfere	74[a]	34	18
13. Doesn't usually contradict other teachers	64[a]	32	16
14. Uses Socratic method in teaching	16	92[a]	09
15. Doesn't handle questions with lectures	26	85[a]	11
16. Permits student disagreement of opinion	84[a]	25	07
17. Organizes discussion logically	53[a]	56[a]	10
18. Frequently introduces new ideas	29	64[a]	20
19. Involves both students in discussion	43	−20	61[a]
20. Directs and controls discussion	11	47[a]	33
21. Critically reviews student workup	−12	06	38
22. Utilizes laboratory data in diagnosis	07	68[a]	37
23. Emphasizes basic pathophysiology	08	80[a]	25
24. Expects and utilizes outside reading	−11	65[a]	10
25. Requires follow-up on cases presented	38	11	14
26. Finds out what the student doesn't know	06	86[a]	34
27. Personally interviews and examines patient	31	08	24
28. Respects patient as a person	91[a]	−02	10
29. Sensitive to emotional reaction of patient	94[a]	−06	22
30. Suggests pertinent outside reading	11	30	41
31. Well-grounded in his field	26	55[a]	54[a]
32. Refers pertinently to recent literature	−13	−03	70[a]
33. Extensive knowledge in a subspecialty	−10	22	32
34. Well-read beyond subjects he teaches	52	29	45[a]
35. Synthesizes case, outlines practical course	67[a]	55[a]	28
36. Personal Qualities (student)	86[a]	38	20
37. Teaching Techniques (student)	59[a]	65[a]	13
38. Actual Teaching Session (student)	09	76[a]	42
39. Teaching by Example (student)	77[a]	12	37
40. Knowledge (student)	30	43	64[a]
41. Teacher-Patient (student)	97[a]	−03	15
42. Teacher-Student (student)	02	02	01
43. Total (student)	70[a]	53[a]	34
44. Summary Grade (student)	62[a]	55[a]	27
45. "Best Friend" (student)	65[a]	48[a]	24
46. Unstructured Comments (student)	64[a]	54[a]	33
47. Personal Qualities (admin.)	26	08	88[a]
48. Teaching Techniques (admin.)	25	20	87[a]
49. Actual Teaching Session (admin.)	19	22	92[a]
50. Teaching by Example (admin.)	39	−02	84[a]
51. Knowledge (admin.)	−03	26	91[a]
52. Teacher-Patient (admin.)	48	−02	63[a]
53. Teacher-Student (admin.)	−20	36	82[a]
54. Overall Performance (admin.)	22	16	93[a]
55. Summary Grade (admin.)	23	25	92[a]
56. "Best Friend" (admin.)	13	−07	29

Note.—Variables 1–35 are the student questionnaire items.

[a] These loadings are larger than the root-mean-square loading for their factor.

tion of the "high" loadings for a factor —where, consistent with the varimax rationale, a high loading was taken as one greater than the root-mean-square loading for the factor. Items with high loadings on Factor A were: is polite, modest, tolerant, and likeable; has a sense of humor; is sympathetic toward students; gains cooperation of students; respects the patient as a person; and is sensitive to the emotional aspects of the patients' problems.

We have labeled Factor A an Attitude factor because it was believed that it represented an estimate of the teacher's attitude toward patients and students in the clinical teaching program. N. L. Gage[5] has suggested the term *affective merit* in the sense of the teacher's ability to promote the student's emotional and social security in the student-teacher relationship.

Similarly, Factor B had high loadings on the following items: is inspiring and stimulating, uses the Socratic method of teaching, emphasizes basic pathophysiology, utilizes laboratory data in discussions, and finds out what the student does not know.

Factor B is labeled a Teaching factor —what Della Piana and Gage (1955)

[5] N. L. Gage, personal communication, November 1959.

would call *cognitive merit*—the ability of the instructor to promote a student's achievement of cognitive objectives, or knowledge and understanding of the subject.

Factor C is more difficult to interpret and name. It had high loadings on 9 of the 10 variables involving administrator ratings but high loadings on only 5 variables derived from students' responses. Why did the administrator variables load so highly on this factor? It would appear that they were able to rank each instructor on an overall basis, i.e., they were unable to differentiate between the traits suggested by the titles of the variables. But what is this overall basis—different from Attitude or Teaching? To attempt to answer this question, we note that the 5 student questionnaire variables with high loadings on Factor C were most concerned with a teacher's knowledge. More specifically, among the variables derived from the questionnaire given to the students, Variable 40—Knowledge—consistently had the highest correlations with the administrator's variables. For these reasons, we have decided tentatively to label Factor C Knowledge. It would appear that an administrator distinguished among teachers primarily on the basis of a teacher's knowledge. Thus, teachers' knowledge seemingly produced a halo effect when the administrators attempted to view a teacher in other ways.

Teachers' knowledge is not substantially evaluated by their medical students. (This does not imply that the students do not consider teachers' knowledge important, but rather that they tend not to differentiate between their teachers on this dimension).

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(Received March 6, 1962)

Journal of Educational Psychology
1962, Vol. 53, No. 5, 224–235

AN EMPIRICAL CHARACTERIZATION OF HIGHER EDUCATIONAL INSTITUTIONS[1]

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A factor analysis of 33 major attributes of colleges was performed using a sample of 335 institutions. These attributes included traditional "type" characteristics (e.g., Religious vs. Nondenominational), financial resources, measures of faculty and student characteristics, and measures of of college "environment." The 6 principal dimensions along which institutions appear to differ were identified as: Affluence (wealth), Size, Private (vs. Public), Masculinity (vs. Femininity), Realistic (Technical) Emphasis, and Homogeneity. Affluence, which accounted for the largest proportion of variance, had high loadings from measures of the college's financial resources, student quality, faculty quality, and certain environmental characteristics.

In attempting to assess the impact of higher education on the student, researchers are often confronted with the problem of how to differentiate among collegiate institutions. Institutional characteristics are, in a sense, the "independent variables" which are used to account for differences in student development.

The purpose of this study was to determine, by means of a factor analysis of 33 major institutional characteristics, the principal dimensions along which higher educational institutions differ. Presumably, the results of such an analysis would: (*a*) provide researchers with a more limited set of empirical dimensions which account for the major variations among institutions; and (*b*) provide evidence regarding the structure of higher educational institutions, particularly with regard to the interrelationships of such variables as the college's financial resources, the college "environment," and the characteristics of the faculty and student body.

Comparative studies of colleges have traditionally differentiated among institutions by means of one or more "type" characteristics: Public versus Private, Religious versus Nonsectarian, Liberal Arts Colleges versus Teachers' Colleges versus Complex Universities, etc.

There have also been attempts to assess institutions in terms of continuous variables. Among the more commonly used of these are economic variables such as Endowment, Tuition Fees, and Faculty Salaries; or alumni information such as the proportion of graduates listed in *Who's Who* or the proportion of graduates who later receive PhDs.

A recent development has been the measurement of the *psychological climate* or environment of the college. Pace and Stern (1958) have developed the College Characteristics Index (CCI), a true-false inventory which yields 30 environmental "press" measures for the college. Astin and Holland (1961) have developed the Environmental Assessment Technique (EAT), which attempts to assess the college environment in terms of eight characteristics of the student body: its size, average intelligence, and six "personal orientations" based on the proportions of students in each of six classes of major fields. EAT variables were found to account for a substantial

[1] This study is a part of the research program of the National Merit Scholarship Corporation and was supported by a grant from the National Science Foundation.

portion of the variance in CCI scales. More recently (Astin, 1962a), it was found that the EAT predicts students' ratings of the college environment, as well as the perceived "effects" of the college as reported by the student.

PROCEDURE

Sample of Institutions

The sample of institutions chosen consisted of 335 accredited, 4-year degree-granting colleges and universities. Each institution was selected on the basis of its having enrolled in the fall of 1959 15 or more students from a 10% random sample of high school juniors scoring above the sixty-fourth percentile on the 1958 National Merit Scholarship Qualifying Test (NMSQT). Institutions were selected in this way so that relatively reliable estimates of the aptitude levels of their entering students would be available. The bias inherent in this sampling would tend to exclude colleges with relatively small enrollments and colleges with student bodies of relatively low aptitude level. Nevertheless, the sample of 335 accounts for approximately 70% of the total undergraduate enrollment in all universities and 4-year colleges.

Measures of Institutional Characteristics

Thirty-three institutional variables were selected for study. In choosing these variables an attempt was made (wherever permitted by available data) to include all methods which have been used for characterizing institutions in previous studies. Except where otherwise indicated, it can be assumed that the information regarding institutional characteristics was obtained from *American Universities and Colleges* (Irwin, 1960). In most cases the data in this book were reported by each institution for the academic year, 1958–59.

Institutional Type Characteristics. The most commonly used methods of typing institutions of higher learning include: type of control (Public versus Private, Religious versus Nondenominational), level of degree offered, and curricular emphasis (liberal arts colleges, teachers' colleges, and technological institutions). Six measures of these characteristics were employed as follows:

1. Private (versus Public) Control (public score 0; private score 1)
2. Degree of Religious Control (nondenominational score 0; Protestant control score 1; Roman Catholic control score 2)[2]
3. Degree Level Offered (bachelor's only score 0; master's score 1; doctorate (PhD) score 2)
4. Liberal Arts Emphasis (no liberal arts college score 0; liberal arts plus other colleges score 1; liberal arts college only score 2)
5. Teacher Training Emphasis (no teachers' college score 0; teachers' college plus other colleges score 1; teachers' college only score 2)
6. Technological Emphasis (no technical school score 0; technical school plus other colleges score 1; technical school only score 2)

Financial Characteristics. Measures of six financial characteristics were obtained as follows:

7. Tuition (for public institutions, nonresident fees were used)
8. Endowment (estimated market value)

[2] Wherever possible, several scoring procedures (dichotomies, trichotomies, etc.) were tried for each of these "type" characteristics. Alternative procedures were compared by plotting the characteristic against several of the continuous variables where significant correlations would be expected. The scoring procedures eventually used were those which tended to yield the most satisfactory plots in terms of linearity and homoschedasticity.

9. Operating Budget (the annual expenditure for "educational and general" purposes, which includes faculty salaries, administrative expenses, etc.)

10. Capital Income ("gifts and appropriations for capital purposes")

11. Scholarship Funds (funds available for scholarships and fellowships)

12. Research Funds (income from "contract research and services")

In order to correct for differences in the sizes of institutions, all financial characteristics (except tuition) were divided by the institution's total enrollment, thereby expressing each measure on a "per student" basis.[3]

Student Characteristics. Twelve characteristics of the student body were assessed as follows:

13. Percentage of Males in the Student Body

14. Percentage of Foreign Students in the Student Body

15. Percentage of Graduate Students in the Student Body

16. Percentage of Merit Scholars in the Student Body (concentration of Merit Scholars in the student body as reported in the *Fifth Annual Report* of the National Merit Scholarship Corporation, 1960)

17. Total Enrollment

18. Aptitude Level of the Student Body (Mean NMSQT score of the entering students; the numbers of NMSQT students entering these institutions ranged from 15 to 221, with a median N of 26)—These means have been shown previously (Astin & Holland, 1961) to be adequately representative of differences in aptitude level of the total student bodies at each institution

19. Realistic Orientation (percentage of majors in agriculture, forestry, engineering, etc.)

20. Intellectual Orientation (percentage of majors in natural science, mathematics, philosophy, etc.)

21. Social Orientation (percentage of majors in education, nursing, sociology, etc.)

22. Conventional Orientation (percentage of majors in accounting, business, economics, etc.)

23. Enterprising Orientation (percentage of majors in public administration, political science, foreign service, etc.)

24. Artistic Orientation (percentage of majors in art, music, journalism, foreign languages, etc.)

25. Homogeneity of the Environment

Variables 17–24 comprise the EAT described previously. The EAT has been included not only as a measure of the college's psychological climate, but also as a convenient means for describing the institution's curricular emphases in more detail. Information on major fields of the graduates was obtained from *Earned Degrees Conferred by Higher Educational Institutions: 1957–1958* (United States Office of Education, 1959).

Variable 25, Homogeneity of the Environment, is defined as the difference between the highest and lowest personal orientations at the college. If, for example, a college were dominated by one particular orientation, it would tend to receive a high score on homogeneity. On the other hand, if the major fields of the students were distributed fairly evenly among the six orientations, the institutions would have a low (more heterogeneous) score.

Faculty Characteristics. This included:

26. Percentage of Faculty Holding Doctoral Degrees (only full-time faculty were included, and faculty members

[3] Some financial variables may, to an extent, be experimentally dependent: Operating Budget depends partially upon both Endowment income and Tuition fees, and Scholarship Funds may depend upon Endowment income.

with professional degrees were excluded in computing the percentages)

27. Faculty-Student Ratio (number of full-time faculty divided by the total enrollment)

Miscellaneous Characteristics. Included here are:

28. Library Size (number of books in the library)

29. Relative Library Size (number of books divided by the total enrollment)

30. Growth Rate (percentage of increase in total enrollment between 1956 and 1960)

31. ROTC (no ROTC score 0; ROTC score 1)

32. Variety of Curriculum (total number of different major fields in which baccalaureate degrees are awarded, as reported in *Earned Degrees Conferred by Higher Educational Institutions*, United States Office of Education, 1959)

33. PhD Output (the percentage of the institution's bachelor's degree recipients who later obtain PhD degrees, as estimated from *Doctorate Production in United States Universities: 1936–1956*, National Academy of Sciences-National Research Council, 1958)

METHOD

Product-moment correlations were computed among the 33 variables.[4] The resultant matrix was factored by the principal components method and rotated to orthogonal, simple structure by the normalized varimax procedure. Computations were performed on the IBM 704 computer using a program devised by Wexler (1959). After the initial complete component extraction run, those components accounting for more than 3% of the total variance were retained. Communality estimates were inserted in the diagonals and the matrix refactored until the communalities had converged. The criterion of convergence was that each new communality did not differ from its preceding estimate by more than .01. Six such factor runs were required in order to achieve communality convergence. Since plots of the rotated factors did not suggest any further adjustments which would improve simple structure, no oblique rotations were attempted. The 335 institutions were then subdivided into the following groups: Public ($N = 140$), Private ($N = 195$), Universities ($N = 125$), Liberal Arts Colleges ($N = 113$), and Men's Institutions ($N = 46$).

The same computational procedures were performed separately on each of the subgroups of institutions. In these analyses certain inappropriate variables were omitted (e.g., the Public-Private dichotomy was not used in the separate analyses of public and private colleges, Percentage of Males was not used in the analysis of men's institutions, etc.). In addition, the Research Funds variable was excluded from all subgroups because these data were reported by only small numbers of institutions in each group. One minor variation in the method was that the five subgroup matrices were refactored only once for communality convergence, in order to reduce computational costs. This decision was also prompted by the fact that the second and final communality estimates in the analysis of 335 institutions did not differ appreciably.

RESULTS

Total Sample of Institutions

Six identifiable factors emerged in the initial analysis of 335 institutions.[5] The

[4] Some of these correlations were based on *N*s of less than 335, since *American Universities and Colleges* (Irwin, 1960) did not report all data for all institutions. Specifically, correlations involving Research Funds were based on *N*s of 163, and correlations involving Endowment, Operating Budget, Capital Income, and Scholarship Funds were based on *N*s of 223.

[5] A 23-page list showing the correlation matrix for the total analysis, and the correla-

TABLE 1

ROTATED FACTOR MATRIX
($N = 335$ institutions)

Institutional variable	Factor[a]						
	Affluence (wealth)	Size	Private (versus Public) Control	Masculinity	Homogeneity	Realistic Orientation	h^2
1. Private (versus Public) Control	15	—05	88	—03	13	—25	.88
2. Degree Religious Control	—37	—19	58	03	08	—28	.59
3. Level of Degree Offered	04	74	—14	15	—06	18	.63
4. Liberal Arts Emphasis	10	—37	56	—18	—25	—25	.62
5. Teacher Training Emphasis	—22	35	—66	—05	—07	—11	.63
6. Technological Emphasis	02	43	—06	39	10	61	.72
7. Tuition	52	16	61	—08	—01	05	.68
8. Endowment/Student	85	—08	31	—05	09	—09	.84
9. Operating Budget/Student	79	13	—13	—02	—04	33	.77
10. Capital Income/Student	65	—12	—03	—06	—14	07	.46
11. Scholarship Funds/Student	78	—07	34	—11	—01	00	.74
12. Research Funds/Student	52	25	—05	24	37	05	.53
13. Percentage of Males	05	16	—02	85	04	12	.76
14. Percentage of Foreign Students	31	52	19	—03	15	14	.45
15. Percentage of Graduate Students	17	81	04	08	19	—17	.76
16. Percentage of Merit Scholars	68	03	18	07	14	—07	.53
17. Total Enrollment	—26	78	—20	18	—24	16	.83
18. Aptitude Level of Students	75	22	43	—01	03	—02	.81
19. Realistic Orientation	—04	16	—20	32	39	82	1.00
20. Intellectual Orientation	50	—22	20	28	—11	—21	.48
21. Social Orientation	—28	02	—40	—56	23	—40	.76
22. Conventional Orientation	—46	10	13	44	—24	—18	.52
23. Enterprising Orientation	40	—12	49	—04	—35	—20	.58
24. Artistic Orientation	27	—15	34	—57	—33	—18	.68
25. Homogeneity of the Environment	—03	—17	—06	—10	69	17	.55
26. Percentage of Faculty with PhD	64	29	—08	—01	—17	—14	.54
27. Faculty-Student Ratio	76	03	14	—11	07	14	.64
28. Library Size	28	79	—02	07	—30	08	.80
29. Relative Library Size	77	09	26	—13	—22	—08	.74
30. Growth Rate	—13	—14	—41	—08	15	—16	.26
31. ROTC	—12	36	—06	48	—22	26	.49
32. Variety of Curriculum	—26	56	—30	—01	—53	09	.75
33. PhD Output	63	11	02	19	21	—26	.56

[a] Decimals have been omitted from factor loadings.

rotated factor matrix is shown in Table 1. Each factor will be presented separately, together with the variables having loadings of at least ±.30. (The percentage of total variance accounted for by each factor is shown in parenthesis after the factor label.)

The term Affluence has been chosen here in preference to wealth since, in addition to financial resources, Factor I also includes assets of the faculty and student body. Affluence accounts for about twice as much variance as any other single factor, and for nearly one-fourth of the total variance. It is of particular interest that the more affluent institutions also charge more tuition, and have climates characterized by high intellectual, high enterprising, and low conventional orientations. (The negative loading for the conventional orientation is probably also due in part to the ipsative method of scoring the six EAT personal orientations.)

The presence of Percentage of Graduate Students, Library Size, and Level of Degree Offered as high-loading variables suggests that Factor II might also be labeled graduate emphasis. Size has been chosen primarily because it is relatively unambiguous. (It is also to be expected that colleges of technology and education—teacher training—would more likely be found in larger institutions.) Perhaps the most important fact to recognize from Factor II is that Library Size, Total Enrollment, Level of Degree Offered, and Emphasis on Graduate Study are highly related. (The six correlations among these variables actually ranged from .49 to .70.)

Here one of the traditional type characteristics appears to have been reproduced as a factor. The original correlations between Public-Private and other variables reveal a pattern almost identical to the factor loadings: the Private Institution, as would be expected, tends

tion and rotated factor matrices for the five subgroup analyses, along with a 6-page list of the 335 institutions ranked (1–335) on the five factor scores, have been deposited with the American Documentation Institute. Order document No. 7262 from ADI Auxiliary Publications project, Photoduplication Service, Library of Congress; Washington 25, D. C., remitting in advance $2.25 for microfilm or $5.00 for photocopies.

TABLE 2

FACTOR I: AFFLUENCE
(22.1)

Variable	Factor loading
Endowment	.85
Operating Budget	.79
Scholarship Funds	.78
Relative Library Size	.77
Faculty-Student Ratio	.76
Aptitude Level of Student Body	.75
Percentage of Merit Scholars	.68
Capital Income	.65
Percentage of Faculty Holding Doctorates	.64
PhD Output	.63
Research Funds	.52
Tuition	.52
Intellectual Orientation	.50
Conventional Orientation	—.46
Enterprising Orientation	.40
Degree of Religious Control	—.37
Percentage of Foreign Students	.31

TABLE 3

FACTOR II: SIZE
(12.5)

Variable	Factor loading
Percentage of Graduate Students	.81
Library Size	.79
Total Enrollment	.78
Level of Offered	.74
Curriculum Variety	.56
Percentage of Foreign Students	.52
Technical Emphasis	.43
Liberal Arts Emphasis	—.37
ROTC	.36
Teacher Training Emphasis	.35

TABLE 4

FACTOR III: PRIVATE (VERSUS PUBLIC) CONTROL (11.4)

Variable	Factor loading
Private (versus Public)	.88
Teacher Training Emphasis	—.66
Tuition	.61
Religious Affiliation	.58
Liberal Arts Emphasis	.56
Enterprising Orientation	.49
Student Aptitude	.43
Growth Rate	—.41
Social Orientation	—.40
Scholarship Funds	.34
Artistic Orientation	.34
Endowment	.31
Curriculum Variety	—.30

more to emphasize liberal arts (r = .51),[6] charges higher tuition fees (.67), enrolls more able students (.49), and has more scholarship funds (.44) and higher endowments (.50) than the public institution. The public institution, on the other hand, tends more to emphasize teacher training (−.56), is growing at a faster rate (−.34), and offers a wider variety of courses (−.40). The environmental orientation of the private institution tends to be more enterprising (.48), more artistic (.36), and less social (−.23) than that of the public institution.

Factor IV shows that the sex ratio in the student body is a major factor in the institution's climate. A high Artistic Orientation (−.61) and a high Social Orientation (−.49) are more likely to be found where there are relatively more women, whereas the predominantly male student body is more likely to be high on the Conventional Orientation

[6] Wherever factors are interpreted in terms of the highest-loading variable, the original correlations of that variable with the others will be shown in parentheses.

TABLE 5

FACTOR IV: MASCULINITY (VERSUS FEMININITY) (7.2)

Variable	Factor loading
Percentage of Males in the Student Body	.85
Artistic Orientation	—.57
Social Orientation	—.56
ROTC	.48
Conventional Orientation	.44
Technological Emphasis	.39
Realistic Orientation	.32

(.37) and Realistic Orientation (.43). (The presence of ROTC is, of course, somewhat artifactual, since women's colleges do not have ROTC units.) While again it is likely that the ipsative scoring of the EAT personal orientations has affected these loadings, it is significant that Holland (1962) has characterized the Realistic type as masculine and both the Social and Artistic types as feminine.

Factor V may to an extent be artifactual, since homogeneous environments (i.e., those dominated by one particular personal orientation) would, almost by definition, offer a smaller variety of courses than heterogeneous environments. Nevertheless, it is of interest that institutions with more homogeneous en-

TABLE 6

FACTOR V: HOMOGENEITY (5.9)

Variable	Factor loading
Homogeneity of the Environment	.69
Curriculum Variety	—.53
Realistic Orientation	.39
Research Funds	.37
Enterprising Orientation	—.35
Artistic Orientation	—.33
Library Size	—.30

TABLE 7

FACTOR VI: REALISTIC (TECHNICAL) EMPHASIS (6.3)

Variable	Factor loading
Realistic Orientation	.82
Technological Emphasis	.61
Social Orientation	—.40
Operating Budget	.33

vironments tend to have higher Realistic Orientations (.35), while institutions with more heterogeneous environments tend to have higher Artistic Orientations (−.25) and higher Enterprising Orientations (−.31).

Factor VI is a reproduction of one of the EAT personal orientations—Realistic Orientation. Institutions scoring high on this orientation, as would be expected, tend to have technological schools (.73). They also tend to have lower Social Orientations (−.37) and somewhat higher Operating Budgets (.22).

RESULTS

Institutional Subgroups

The results of the five subgroup analyses will be only briefly summarized. Perhaps the most important finding was that the six factors obtained in the total analysis tended to reappear in each subgroup analysis. One additional factor, which occurred in all five subgroups but not in the total analysis, was identified as Intellectual (Scholarship) Orientation. (In the total analysis, this factor appears to have merged with Affluence.) This factor, which accounted for between 4.0 and 5.8% of the variance in the subgroups, will be shown as it occurred in the analysis for liberal arts colleges.

Of special interest here is the fact that PhD Output occurs together with three other characteristics of the student body. In the early studies of PhD Output (Knapp & Goodrich, 1952; Knapp & Greenbaum, 1953; Wooster Conference Report, 1959), the different PhD Outputs of institutions were interpreted mainly in terms of certain institutional effects on the student. However, the nature of this factor, together with several more recent studies (Astin, 1961, 1962b; Astin & Holland, 1962; Holland, 1957), would suggest that an institution's PhD Output is primarily dependent upon the ability and interests of the students it initially recruits.

Additional findings in the analyses of the five subgroups can be summarized as follows:

1. Affluence uniformly accounts for the largest amount of variance (about one-fourth) in each subgroup. However, in all subgroups except Public Institutions (see Number 4 below), the highest loading variable on Affluence was Operating Budget, rather than Endowment.

2. In certain subgroup analyses there occurred factors which were not replicated in any other analysis. These factors, however, were generally either difficult to interpret or accounted for only small proportions of the variance (less than 5%). One exception to this was in the analyses of universities and men's institutions, where a factor identified as

TABLE 8

INTELLECTUAL (SCHOLARSHIP) ORIENTATION (5.6)

Variable	Factor loading
PhD Output	.71
Percentage of Merit Scholars	.54
Intellectual Orientation	.50
Student Aptitude	.41

Religious (Conventional) Orientation was found. This factor, which accounted for about 7% of the variance in both analyses, had positive loadings on Degree of Religious Control and Conventional Orientation, and negative loadings on the Realistic Orientation. Among other things, this would suggest the presence in these two subgroups of rather marked differences between the Religious and the Nondemoninational institutions with regard both to their curricula and their psychological climates.

3. The analyses for the liberal arts and private subgroups produced factor structures which were strikingly similar to that found in the total analysis. One interesting deviation in the factor loadings occurred in the liberal arts analysis, where the Realistic Orientation had a high negative (rather than positive) loading on the Homogeneity factor. Among liberal arts colleges, then, as opposed to the other subgroups, a high Realistic Orientation is more characteristic of heterogeneous environments.

4. The structure of Public Institutions in general appeared to be more complex than the structure of Private Institutions. Among Public Institutions, for example, there occurred three (rather than one) Affluence factors. The first two of these appeared to reflect two relatively independent sources of "financial wealth": one involving Endowment; the other involving Operating Budget. It would apear that the highest-endowed Public Institutions are not necessarily the same ones receiving the largest appropriations for operating expenses. Moreover, it was shown that Merit Scholars were more likely to attend high Operating Budget than high Endowment Public Institutions. The third Affluence factor in Public Institutions combined the Aptitude Level of Students with the Size factor. In other words, the aptitude level of the public institution's student body appears to be more highly related to its size (and emphasis on graduate study) than it is to either index of financial wealth.

5. There were several notable differences in the factor structure of universities: (*a*) Two (rather than one) Affluence factors were found: the first appeared to be a purely financial wealth factor; the second combined Percentage of Graduate Students, Percentage of Foreign Students, Student Ability, and the Private (versus Public) Control factor. This second Affluence factor might be labeled Prestige. (*b*) Size was clearly reproduced, but it did not, as in the total analysis, contain a high loading on Percentage of Graduate Students. This would suggest that Percentage of Graduate Students and Level of Degree Offered are related to Size in the total ($N=335$) analysis simply because universities enroll more students than other institutions.

6. The structure of men's institutions appears to be the simplest of all groups, with 83% of the variance accounted for by only seven factors. In the analysis of these men's institutions, Realistic, Homogeneity, and Masculinity combined into a single factor. There appear, therefore, to be two types of men's institutions at opposite poles of this factor: (*a*) those with homogeneous environments, which emphasize a technical curriculum, offer a narrow range of courses, and have high Realistic (masculine) Orientations; and (*b*) those with heterogeneous environments, which emphasize a liberal arts curriculum, offer a wide variety of courses, and have high Enterprising and Artistic (feminine) Orientations. This factor actually accounted for as much variance among men's institutions as did Affluence (22% in both cases).

DISCUSSION

The high factor loadings found in these analyses suggest that the practical task of differentiating among institutions can be simplified considerably. That is, if we use the factors which were obtained to represent the principal dimensions along which collegiate institutions vary, we can describe or profile institutions in terms of factor scores derived from one or two of the highest loading variables on each factor. Table 9 shows the manner in which these factor scores were computed. If the factors are expressed in normalized standard score units, it becomes possible to compare the profiles of selected institutions or to compare any single institution with all others.

To illustrate this procedure more concretely, the profiles of factor scores for three institutions have been compared (Figure 1). Two of the institutions (Ohio State University and University of Wisconsin) were selected on the a priori assumption that they should show similar profiles. The third institution, Massachusetts Institute of Technology (MIT) was selected with the expectation that it would show a markedly different profile from the other two.

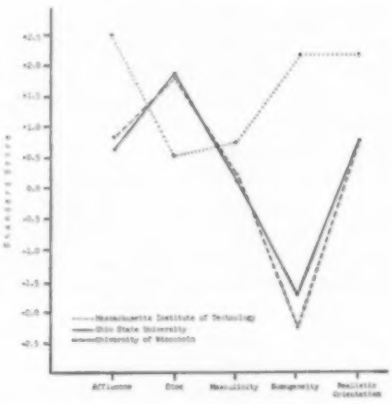

FIG. 1. Comparison of profiles of three institutions on five factor scores.

Figure 1 demonstrates that Ohio State and Wisconsin are indeed similar on the five factor scores. Both are above average in Affluence, far above average in Size, about average on Masculinity, extremely heterogeneous (Wisconsin somewhat more than Ohio State), and above average on the Realistic Orientation. MIT, by contrast, differs from

TABLE 9

VARIABLES USED IN COMPUTING FACTOR SCORES
($N = 335$ institutions)

Factor	Representative variable	Correlation of variable with factor
Affluence	Operating Budget	
	Aptitude of Student Body	$R = .88$
Size	Total Enrollment	$r = .78$
Masculinity [a]	Social Orientation (—)	
	Artistic Orientation (—)	
	Conventional Orientation	$R = .82$
Homogeneity	Homogeneity of the Environment	
	Curriculum Variety (—)	$R = .79$
Realistic (Technical) Emphasis	Realistic Orientation	$r = .82$

[a] In order that differences in Masculinity would be possible among noncoeducational institutions, Percentage of Males in the Student Body was not used as the representative variable.

Ohio State and Wisconsin by at least one standard deviation on every factor except Masculinity. MIT is, in fact, one of the most Affluent, Homogeneous, and Realistically Oriented of all 335 institutions studied. Moreover, since MIT is a Private Institution, we would also expect it to differ from Ohio State and Wisconsin on some of the correlates of the Private Control factor (e.g., higher Tuition, less Teacher Training Emphasis, etc.).

Results of these analyses can also be used to interpret differences among colleges on the original 33 variables. For example, from Table 1 it can be seen that 80% of the variance among the mean ability levels of student bodies is a function of three factors: Affluence (56%), Private versus Public (19%), and Size (5%). Similarly, 79% of variance in Size of the Library is a function of Size (62%), Heterogeneity (9%), and Affluence (8%). A similar use of Table 1 would be to determine the types of institutions which receive funds of a given kind or which attract a certain kind of student. It can be seen, for instance, that research grant money is more likely to be awarded to affluent, homogeneous, masculine institutions, or, that foreign students are more likely to attend large, affluent institutions.

With the classification scheme described here (see Footnote 5), it becomes possible to compare institutions for a variety of purposes. "Similar" colleges become, in a sense, those with similar patterns of factor scores. This relatively limited set of factor scores might be useful in research, for example, in deciding how to select representative or other special samples of institutions for study. Similarly, guidance counselors might find this scheme useful for assisting the student in choosing the most appropriate institution.

We have, of course, no assurance that this analysis has taken into account all, or even most, of the major institutional differences. Further study is needed, not only of those factors which appeared in just one subgroup, but also of certain variables with relatively low communalities. Any new institutional variable, however, can be compared with the present factors for redundance, to learn whether or not it is necessary to postulate an additional factor.

It is of some interest in these analyses that several of the EAT variables were replicated as factors. Size, Student Ability (Affluence), the Realistic Orientation, and (in the subgroups) the Intellectual Orientation, occurred as separate factors. However, the Conventional, Social, Artistic, and Enterprising Orientations were spread among several factors.

SUMMARY

An empirical approach to differentiating among higher educational institutions was described. Thirty-three institutional variables, including measures of the students, faculty, college climate, financial resources, and the more commonly-used institutional types, were selected for study. Using a sample of 335 institutions, these 33 variables were factor analyzed to determine the principal dimensions along which collegiate institutions differ. Six identifiable factors emerged from the analysis: Affluence (Wealth), Size, Private (versus Public), Masculinity (versus Femininity), Realistic (Technical) Emphasis, and Homogeneity of the Environment. Similar factors were also found in separate analyses of public institutions, private institutions, universities, liberal arts colleges, and men's institutions. An additional factor, Intellectual (Scholarship) Orientation, occurred in each of the subgroup analyses. Affluence, which included financial wealth, assets of the

faculty and students, as well as measures of the college environment, accounted for about twice as much variance as any other single factor.

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(Received March 19, 1962)

Journal of Educational Psychology
1962, Vol. 53, No. 5, 236–241

THE EFFECT OF ATTENTION AND MOTOR RESPONSE PRETRAINING ON LEARNING TO DISCRIMINATE B AND D IN KINDERGARTEN CHILDREN [1]

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This study compared 3 groups of kindergarten children (49 Ss in all) in learning names for the letters "b" and "d." An Attention-Consistent Motor (A-CM) group received pretraining in attending to the directional difference between the letters and making consistent motor responses to each letter. An Attention-Inconsistent Motor (A-IM) group received similar attention pretraining, but made inconsistent motor responses to each letter. An Irrelevant-Control (Ir-C) group received attention and motor response pretraining to color stimuli. Performance of the 3 groups on the letter-naming transfer task showed the 2 attention groups superior to the control group. No significant performance differences were associated with the motor response variable.

Developmental studies (Gellerman, 1933; Rice, 1930) indicate that young children discriminate form at an earlier age than they respond to changes in orientation or inversions of plane figures. Newhall (1937) found there were differences in discrimination performance associated with types of inversions. He showed that children observed up-down inversions consistently as early as 3 years of age. The left-right inversion, by contrast, was responded to inconsistently as late as 5 years. Davidson's (1935) findings with letter inversions were similar in trend to Newhall's. Davidson reported that up-down inversions illustrated by "q" and "d" were discriminated by more than 50% of the kindergarten-aged children. At the same age, left-right inversions, illustrated by "b" and "d", were discriminated by less than 10%. It was not until 7½ years that 50% of the children identified left-right inversions correctly.

Developmental norms of this type require careful interpretation, particularly if they are to be used as the basis for making statements about children's "readiness" to learn certain tasks. Do the norms reported on the left-right inversion mean that preschool and early school-aged children: (*a*) literally cannot "see" the difference between two figures so inverted, or (*b*) lack the instructional set to realize that this kind of a difference is important? Since research has shown that the same age children do discriminate, and therefore see, an up-down inversion, it is likely they could also see a left-right inversion, providing they have a set to attend and differential responses to associate with this difference. Although children of this age do not usually have left and right as meaningful directional labels in their vocabulary (which is the case with up and down), they may well have other distinctive verbal or nonverbal responses they could learn to associate with this directional difference.

An experimental study reported by

[1] The authors wish to thank B. W. Garner, Superintendent of Schools, Iowa City; C. Railsback, Principal; and Rae Blanchard and Dorothy Brejcha, kindergarten teachers, whose cooperation made this research possible.

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Jeffrey (1958) offers support for this assumption. Jeffrey's subjects learned names for two stick figures differing only in the direction an arm pointed—left or right. The results showed that the subjects given motor-response pretraining in pushing a button (one of two) that was on the side to which the stick figure pointed performed better on the naming task than a control group lacking the motor pretraining.

Jeffrey's results suggest two types of responses, and response produced cues, that the children may have learned to associate with the directional difference of the arms in the motor-response pretraining: "attention" cues produced by an instructional set to observe the directional element of the arm, a necessary condition for making the correct button response; or kinesthetic cues produced by reaching left and right for the buttons. In either case the assumption would be that these distinctive response produced cues, separately or in combination, became an implicit part of the response pattern to each of the stick figures; that this acquired distinctiveness (Miller, 1948) transferred to the naming task facilitating learning.

The purpose of the current study was to investigate further the relative effectiveness in kindergarten-aged children of attention and motor-response, produced cues on learning to associate verbal labels with the letter inversions b and d.

METHOD

Pretraining

The basic piece of equipment was a Hunter Cardmaster (Hunter Manufacturing Company, Coralville, Iowa). The Cardmaster is designed to present 3½ × 6¼ inch plastic cards in a viewing aperture. By means of a separate timer unit, two metal shutters can be used to cover or expose the viewing aperture to secure the following exposure intervals: an anticipation interval, with one shutter open to expose half of the card; a joint presentation interval, with both shutters open to expose the entire card; and a between-cards interval, with both shutters closed during which time a new card is automatically positioned behind the viewing aperture.

For the pretraining task, an additional response unit was placed in front of the Cardmaster; an opening in this unit allowed the subject to view the Cardmaster aperture. The frame of this response unit was 20 inches wide, 18 inches high, and 12 inches deep. A low, slanted platform extending below the Cardmaster window was cut with two parallel slots, 3½ inches apart, to allow the traverse of the two handles. The handles were covered by rubber tricycle handlegrips. Microswitches at the ends of the slots were connected with a doorbell chime, controlled via a remote control switch by the experimenter. This chime indicated and rewarded correct responses in pretraining. The sides and top of this apparatus were designed to minimize the possible effects of cues in the experimental room.

For pretraining, three different sets of Cardmaster cards were used, one for each of three pretraining groups. On each card were three stimuli of the same relative size and in the same relative positions. Each set contained a series of eight cards. These three sets are shown in Table 1.

TABLE 1

ORDER OF STIMULUS PRESENTATION FOR THREE GROUPS IN PRETRAINING

Trials	Attention-Consistent Motor	Attention-Inconsistent Motor	Irrelevant-Control [a]
1	d ← →	b ← →	r r-o
2	b ← →	d ← →	o r-o
3	b ← →	d → ←	l p-l
4	d ← →	b → ←	p p-l
5	b ← →	d → ←	r o-r
6	d ← →	b → ←	l l-p
7	d ← →	b ← →	o o-r
8	b ← →	d ← →	p l-p

[a] Letters here indicate color of patches; no letters actually appeared on these cards.

The stimuli for two of the sets of cards were the lower-case, sansserif letters **b** and **d**. The letters were ¾ inch high and were centered on the cards. One-eighth inch below and ⅜ inch to either side of the letters were two arrows, ¾ inch long. The letters and arrows were printed on the cards in black ink.

For the group designated the Attention-Consistent Motor Response (A-CM) group the arrows below the stimulus letters always pointed outward. For the Attention-Inconsistent Motor Response (A-IM) group half the arrows below the letters pointed inward and half pointed outward.

On the third set of cards were three patches of color. Paired colors cut from construction paper were used: pink (p) paired with lavender (l), and red (r) with orange (o). On each card, one of the smaller patches was the same color as the larger center patch. These cards were used with the Irrelevant-Control (Ir-C) group.

At the beginning of pretraining each subject was seated in front of the apparatus so that either handle could be reached readily. The subjects were instructed to watch the window. The two groups receiving letter stimuli were instructed as follows:

> See this letter. This part of the letter (the experimenter traced the round part of the letter) points this way (the experimenter pointing). Now see these two arrows. They point in different directions. Show me which way this arrow points. And this one. That is right. One of the arrows points the same way as the letter does. Can you find it? Now each time I show you a card, I will want you to find the arrow that points the same way as the letter. But you will not need to point to the arrow each time. Instead you can push the handle that goes to the arrow (The subject was guided to place left hand on left handle; right hand on the right handle). Since this is the arrow that goes the same way as the letter, you would push this handle. Try it. Hear the bell? The bell rings to tell you that you are right. Here is another letter. Find the arrow that goes the same way as the letter, and push the handle towards the arrow.

The pretraining stimuli for the A-CM group (see Table 1) were designed to elicit attention responses to the directional difference between the letters, and to elicit a consistent left arm motor response to letter **d** and a consistent right arm motor response to letter **b**. The stimuli for the A-IM group were designed also to elicit attention responses to the directional differences in the letters; however, the motor responses to the letters were inconsistent; e.g., the left arm response was required on half the presentations of **d**; the right arm response on the other half.

Instructions for the Ir-C group were similar in form to the above and adapted to the task of matching the color stimuli.

Relevant parts of the instructions were repeated throughout the training whenever the subject made an incorrect response. The subject was also told to use only his right hand to push the right-hand handle, and his left hand to push the left-hand handle. This instruction was conveyed without the use of the words left and right.

Both shutters on the Cardmaster opened simultaneously on each trial, exposing the entire card. Each card was presented (via remote control operated by the experimenter) only after the subject had completed his response to the previous card. Thus, there was no fixed time during which the subject was required to respond.

The subjects were given 30 trials following the 2 instructional trials. A trial consisted of a single stimulus presentation.

Transfer Task

The pretraining apparatus was removed, and the Cardmaster placed directly before the subject. The transfer task consisted of the paired-associate presentation of the letters **b** and **d** paired with pictures of a snowman and a pumpkin, respectively. The actual letter names were not used due to the possible difficulty in discriminating the subject's responses. Eight cards with the letter-picture pairs were arranged in the following order: **bddbdbbd**. The pairs were presented with a 3-second anticipation interval (only the letter exposed), a 3-second joint-presentation interval (letter and picture exposed), and a 2-second between-trial interval. The first two trials were instructional. The subject was shown the first two pairings and told that the letter **b** went with the snowman; the letter **d** with the pumpkin. The subject was then instructed to look at the letter each time and try to guess the picture that went with it before he saw the picture.

The subjects were given a maximum of 30 trials following the 2 instructional trials. A trial consisted of the presentation of a letter-picture pair. The transfer task was terminated if the subject reached a criterion of 8 consecutive correct responses; at this point he was credited with correct responses for the remain-

ing trials. Verbal encouragement by the experimenter constituted the reward for correct responses. In addition to correct responses, the subjects were scored for errors and omissions.

Subjects

The subjects were 52 kindergarten children, drawn from a public school in Iowa City. The age range was from 5-4 to 6-11, with a mean age of 5-11. The subjects were taken from the classroom in alphabetical order and assigned in rotation to one of the three groups. Children judged by the teacher to be mentally retarded or who were expected to repeat kindergarten were not used. Two subjects were dropped due to failure to follow instructions in the transfer task, and one was dropped due to apparatus failure. Thus, 49 subjects were retained; 2 groups contained 16 subjects, and the third group 17 subjects. Testing was done in the spring.

RESULTS

Pretraining

The means in percentage of correct responses and standard deviations for the three groups are shown in Table 2. Hartley's test (Walker and Lev, 1953) for homogeneity of variance among the groups was significant ($p < .01$) leading to the rejection of the null hypothesis. To offset the effect of heterogeneity of variance the significance level on subsequent statistical tests was set at .025.

A Type I analysis of variance (Lindquist, 1953) for correct responses over trials showed a significant groups effect ($p < .001$). The trials and interaction effects were not significant. The t test scores between the groups showed the percentage of correct responses for the A-IM group to be significantly less when compared to both the A-CM and Ir-C groups ($p < .001$). The latter groups did not differ significantly.

TABLE 2

PRETRAINING RESULTS BASED ON PERCENTAGE OF CORRECT RESPONSES IN 30 TRIALS

Groups	*M*	*SD*
Attention-Consistent Motor	98.35	4.94
Attention-Inconsistent Motor	86.52	10.22
Irrelevant-Control	98.57	3.94

TABLE 3

TRANSFER TASK RESULTS BASED ON PERCENTAGE OF CORRECT RESPONSES AND ERRORS IN 30 TRIALS

Groups	Response measure			
	Correct response		Error	
	M	*SD*	*M*	*SD*
Attention-Consistent Motor	82.96	18.66	11.34	15.01
Attention-Inconsistent Motor	76.23	18.56	15.37	14.89
Irrelevant Control	62.30	20.68	27.99	17.66

Transfer Task

Table 3 shows the means in percentage of correct responses and standard deviations for the three groups. The learning curves over trials are shown in Figure 1. A Type I analysis of variance

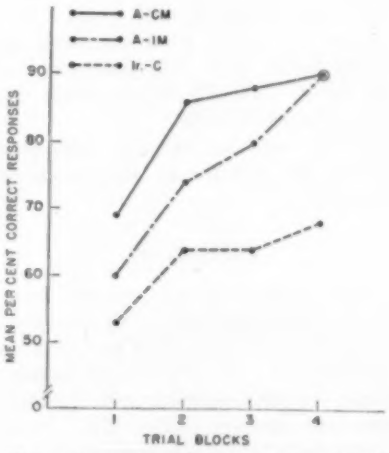

FIG. 1. Percentage of correct responses in the transfer task. (All trial blocks, except the first, contain eight trials. The first trial block contains six.)

of these data indicated a significant groups ($p < .025$) and trials ($p < .001$) effect. The interaction was not significant. The t test scores between the groups showed that when Group A-CM was compared with Group A-IM, the mean difference was not significant. Comparing Group A-CM with Group Ir-C, the difference was significant ($p < .01$). Comparing groups A-IM and Ir-C, the mean difference approached significance ($p < .10$). The subjects reaching a criterion of 8 consecutive correct responses in the groups were compared. There were 12 each in the 2 attention groups; 4 in the Ir-C group. This distribution yielded a significant chi square ($p < .02$) when each of the attention groups was compared with the control.

Table 3 shows the means in percentage of errors and standard deviations for the three groups. A Type I analysis of variance for errors over trials showed a significant groups effect ($p < .025$). The trials and interactions effects were not significant. The t test scores between the groups showed that Group Ir-C made a significantly greater percentage of errors when compared to Group A-CM ($p < .01$) and Group A-IM ($p < .05$). The latter groups did not differ significantly.

There were no reliable differences among the groups on the omissions measure.

DISCUSSION

The findings of the present study showed, first, that pretraining in attending to the directional differences between the letters **b** and **d** facilitated learning names for these same letters in a paired-associate transfer task. This result agrees with Jeffrey's (1958) study with children approximately 1½ years younger, and provides additional evidence that a left-right inversion can be identified considerably before Davidson's (1935) normative age of 7½. Second, the findings showed that pretraining in making a consistent motor response to the directional differences between the letters **b** and **d** did not add significantly to the transfer task performance. Although there was an apparent difference early in learning on the corect response measure favoring the A-CM group compared to the A-IM group (see Figure 1), it is not clear whether this effect was due to A-CM group facilitation or A-IM group interference resulting from the more difficult pretraining task for this group (see Table 2).

Some evidence for the modality of the so-called attention cues was provided by questioning the children, after the transfer task, as to how they knew that a particular letter went with a particular picture. All but two children who reached criterion, irrespective of groups, indicated they used the direction of the letters to tell them apart. Most of these children used gestures to indicate this directional difference. By contrast, two-thirds of those who did not reach criterion gave answers indicating they did not recognize the difference between the letters. None of the children used the letter names or the words left or right in describing the difference. These verbal reports suggest that the attention cues were, at least in part, implicit verbal responses which served to identify each letter by its directional component.

In conclusion, the results of the present study, in conjunction with Jeffrey's (1958) findings, suggest caution in the application of the concept of readiness when this concept is used to prescribe appropriate age levels at which children can optimally learn a particular task. Age norms derived from tests built to assess a given skill level provide no certain evidence as to what age the skill might first be taught and learned pro-

vided the learning conditions were effectively arranged.

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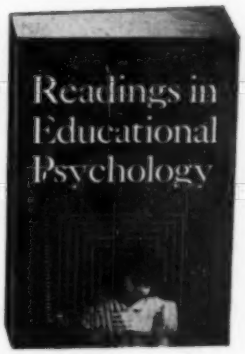

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